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PERFORMANCE ORIENTED PACKAGING TESTING OF  
CNU-263/E FIBERGLASS MAVERICK MISSILE CONTAINER

HQ AFIC/DSTE  
AIR FORCE PACKAGING EVALUATION ACTIVITY  
Wright-Patterson AFB OH 45433-8999

21 NOVEMBER 1988

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## ABSTRACT

Ogden Air Logistics Center (OO-ALC/MSSEM), Hill Air Force Base, Utah 84056-5609 *AFB* requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to conduct Performance Oriented Packaging (POP) testing on a fiberglass Maverick missile container (CNU-263/E).

*are →* The CNU-263/E containers were designed and fabricated by Plastics Research Corporation, Santa Fe Springs CA. The containers are environmentally sealed with a humidity indicator, desiccant port, and a pressure relief valve. The containers are designed to protect one AGM-65A/B/C/D all-up-round Maverick missile during world-wide shipment, storage, and handling. The containers will also be used for one missile without the guidance unit and for one missile without the guidance unit and the hydraulic actuation system.

*use single quotes* The test plan used for the container was derived from United Nation (UN) Standard (Ref. ICAD 4.3), UN Transport of Dangerous Goods, and DOD Hazardous Materials Packaging Test Plan.

Results of the tests conducted on the containers were acceptable. The containers did successfully pass the POP tests, as prescribed by the UN test criteria. Keywords: Air to surface missiles; Fiberglass containers. (cdc) *4*

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## INTRODUCTION

**BACKGROUND:** Ogden Air Logistics Center (OO-ALC/MMWMM), Hill Air Force Base, Utah 84056-5609 requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to conduct Performance Oriented Packaging (POP) testing on a fiberglass Maverick missile container (CNU-263/E). The CNU-263/E container was designed and fabricated by Plastics Research Corporation, Santa Fe Springs CA.

**PURPOSE:** The purpose of this project was to determine whether the CNU-263/E container would not spill its contents, the AGM-65A/B/C/D all-up-round (AUR) Maverick missile. The container will also be used for shipment, storage, and handling of the missile less the guidance unit (GU) and the missile less both the GU and the hydraulic actuation system (HAS). The United Nations (UN) hazard code for the missile is class 1.1F. The packing code is Group II, with the packing method of E146.

## TEST SPECIMEN

Two containers (serial numbers 75231 and 75590) were sent from OO-ALC. The corners of the containers were numbered from the aft end (see figure 1).

**DESIGN:** The CNU-263/E is a controlled-breathing container with a pressure relief valve, a humidity indicator, and a desiccant port. The container is designed to limit the transmission of shocks to the missile at 40G or less when subjected to the conditions in AFSC Specification 1308. Thirty-four T-bolts attach the container cover to the container base. The missile is attached to the container base with two forward, two middle and one aft strap.

**CONSTRUCTION:** The container consists of a fiberglass reinforced plastic cover and base, which have been gel coated. Two pound density polyethylene foam provides cushioning between the missile and the container base. A neoprene (or equivalent) gasket provides a seal between the container base and the container cover.

## TEST OUTLINE AND TEST EQUIPMENT

**TEST PLAN:** Tests were conducted in accordance with table I. Test methods and procedures used were as outlined in UN Standard (Ref. ICAD 4.3), UN "Transport of Dangerous Goods", and DOD Hazardous Materials Packaging Test Plan.

**TEST CONTAINERS:** The tests in this report were performed on CNU-263/E, serial number 75231 (see figure 2). Only one container was used for testing since the tests were severe and it would be too costly to provide a new container for each drop.

**TEST LOADS:** All tests were conducted using the heaviest missile the container was designed for. The test load was an inert training missile weighing approximately 460 pounds. A container base loaded with 2230 pounds (three times the gross weight of a container with a light standard load) was also used for test number 2 to simulate stacked containers.

**TEST SITES:** Testing was conducted at APPEA, HQ AFLC/DSTZ, Building 70, Area C, Wright-Patterson AFB OH. The equipment required for testing was a temperature chamber and a forklift truck.

## **TEST PROCEDURES AND RESULTS**

### **UN DROP TEST**

**Test No. 1:** The container was conditioned at 32°F for 24 hours and then dropped flat on side 4 (long side), the top, the bottom, side 1 (short side), and top corner 1-2. The container shall not spill its contents.

**Results:** Visual inspection revealed that three T-bolts on side 4 disengaged, the top corner 1-2 had a crack, the aft end had a 6 inch crack and the records receptacle cover detached from the container (see figure 3). The container was opened and the following damage was found: aft bottom cushion unglued, one middle strap undone (see figure 4), forward bottom cushion torn (see figure 5) and one forward strap was no longer around the missile (see figure 6). The missile moved in the container and this was evident by a dent in the missile and the shattered dome (see figure 6). However, the container did not spill its contents. Results of this test are acceptable.

### **UN STACKING TEST**

**Test No. 2:** At ambient temperature, a superimposed load of 2230 pounds was placed on the container for 24 hours. The container shall not permanently deform.

**Results:** The container was dimensionally checked and no permanent deformation occurred during the stacking test. The results of this test are acceptable.

## **CONCLUSION**

1. The container successfully passed the POP tests, as prescribed by the UN test criteria.

TABLE I.

AIR FORCE PACKAGING EVALUATION ACTIVITY (Container Test Plan)					AFPEA PROJECT NUMBER 88-P-116	
CONTAINER SIZE (L x W x D) (INCHES)		WEIGHT (LBS)		CUBE (CU. FT.)	QUANTITY	DATE
INTERIOR:	EXTERIOR:	GROSS:	ITEM:			
	107 x 29 x 30	743	460	54	2	15 Sep 88
ITEM NAME AGM-65 Maverick Missile			MANUFACTURER Plastics Research Corporation			
CONTAINER NAME CNU-263/E (UN Tests)					CONTAINER COST	
PACK DESCRIPTION Fiberglass Container						
CONDITIONING As noted below.						
TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S	TEST TITLE AND PARAMETERS		CONTAINER ORIENTATION	INSTRUMENTATION	
1.	<u>UN DROP TEST</u> *(9.7.3)	Condition at +32°F for not less than 24 hours. Drop height 1.2m (3.94 ft) as required for Packaging Group II. The container shall not spill its contents. A different container may be used for each drop.		One each flat drop on the bottom, top, long side, short side and a corner. Total of 5 drops. Test with the heaviest AUR.		
2.	<u>UN STACKING TEST</u> (9.7.6)	Simulate stacking to a minimum height of 3m (9.84 ft) for 24 hours. There shall be no permanent deformation.**				
COMMENTS: * Figures in parenthesis refer to UN "Orange Book" requirements. ** The superimposed load test in MIL-STD-648 exceeds the UN stacking test.						
PREPARED BY: <i>Susan Hughey</i> Susan Hughey, Mechanical Engineer				APPROVED BY: <i>Ralph Zynda</i> RALPH ZYNDA, Chief, Design Br., AFPEA		

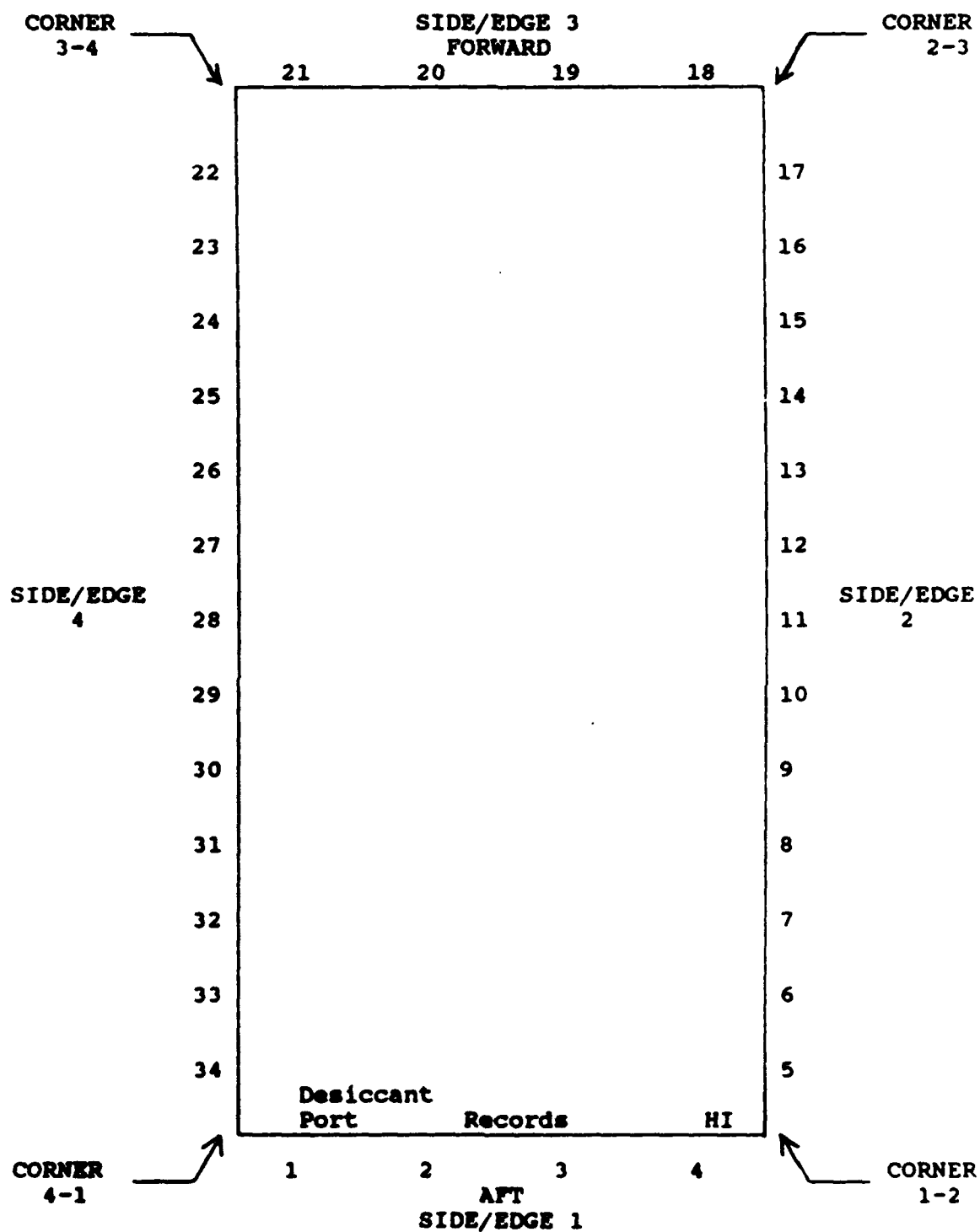


FIGURE 1. CONTAINER CONFIGURATION

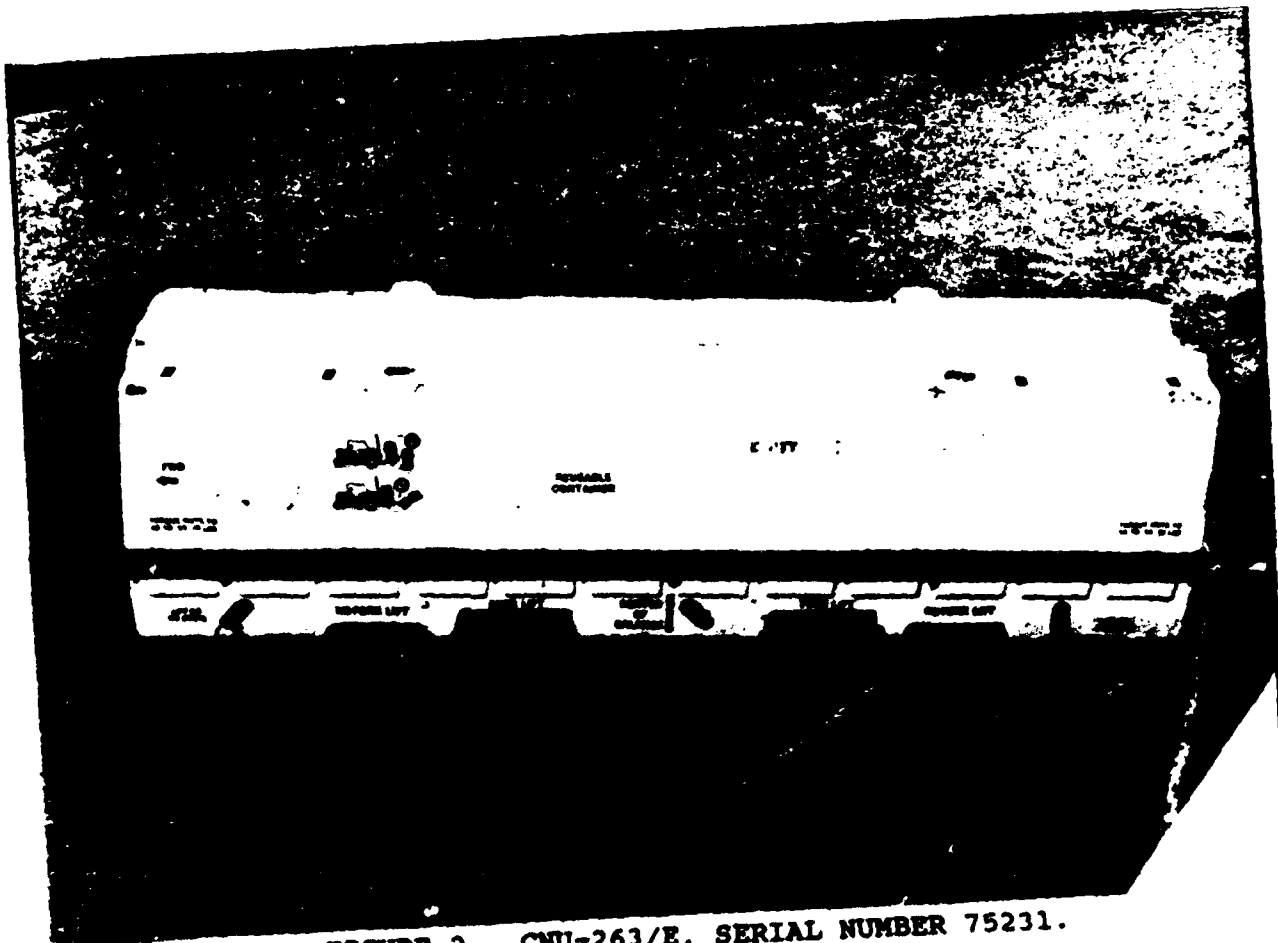


FIGURE 2. CNU-263/E, SERIAL NUMBER 75231.

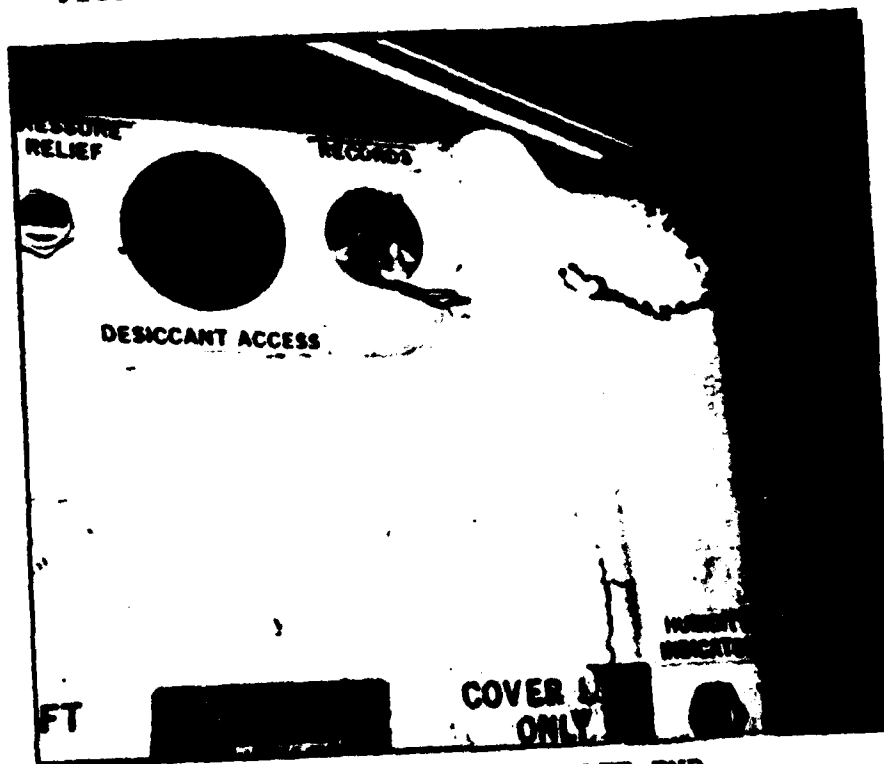


FIGURE 3. CONTAINER AFT END.





FIGURE 4. MIDDLE STRAP UNDONE.

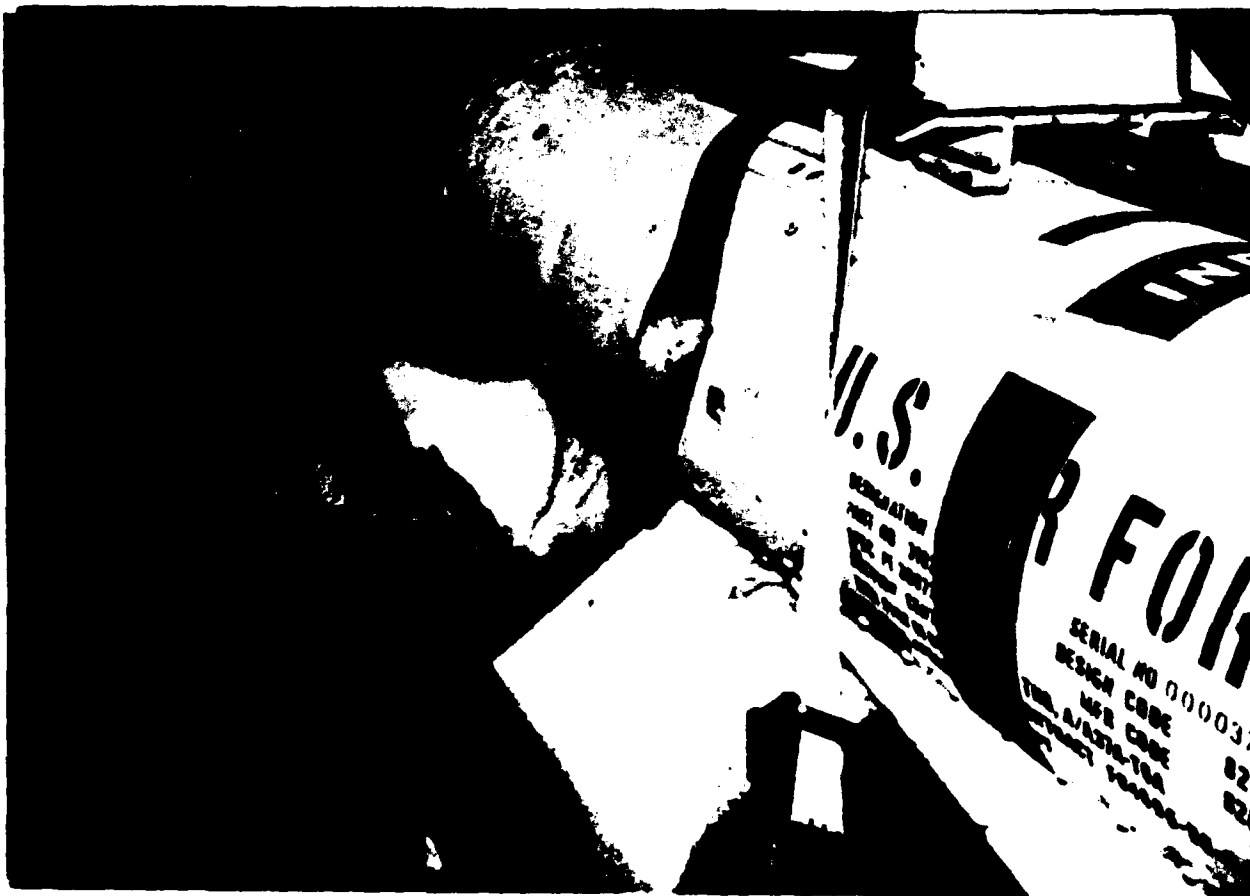


FIGURE 5. TORN FORWARD CUSHION.

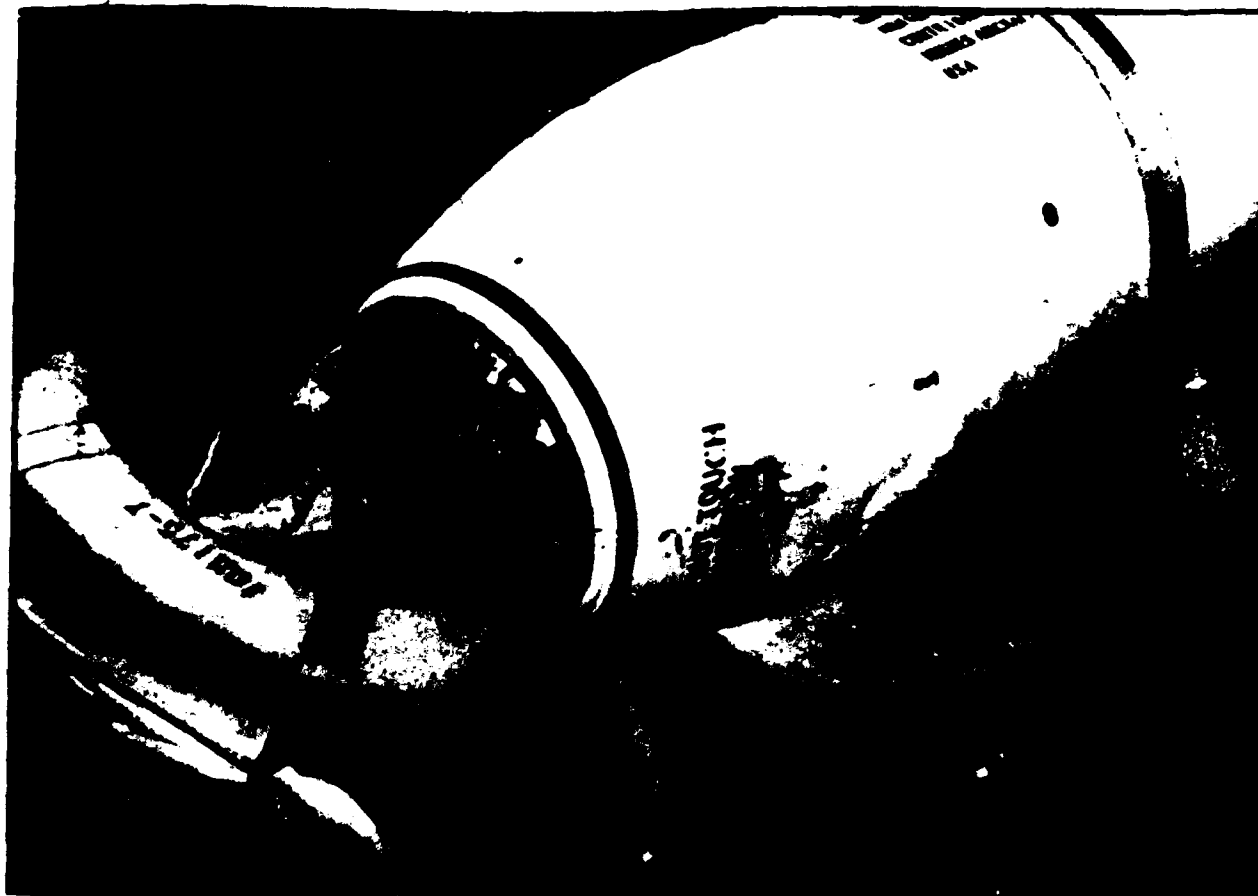


FIGURE 6. FORWARD END OF MISSILE, STRAP UNDONE.

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